

# EXHIBIT 1

# **Soap Technology For The 1990's**

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American Oil Chemists' Society  
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$$30\% \text{ NaOH}_{\text{ADDED}} = \frac{2.16}{208} \times \frac{40}{30} \times 100 = 1.38 \text{ lb}$$

To summarize in molar equivalents, the formulas containing free fatty acids will have the following weight ratios:

Coconut Fatty Acid<sub>WT</sub> < Stearic Acid<sub>WT</sub>.

To illustrate, 5% coconut fatty acid, MW 208 (as FFA) = 6.6% stearic acid, MW 274 (as FFA). In other terms, it will take a greater quantity of stearic acid than coconut fatty acid to neutralize a given quantity of alkali.

## Bar Soap Properties

The physico-chemical properties of soap, such as physical constants, X-ray structure, and solubility data, are described in depth in well known monographs (8).

In the present section, the following product formula related attributes shall be discussed:

- Bar Lathering
- Bar Soap Lather Panel Test
- Bar Cracking
- Bar Mushing & Wear Rate
- Bar Rinsability
- Bar Efflorescence
- Bathtub Deposits
- Bar Graininess & Bar Smoothness
- Soap Alkaline Reaction
- Fatty Acid Migration
- Cleansing

The evaluation of the above properties is usually conducted by a combination of laboratory tests and consumer panels. An excellent book on the statistical treatment of consumer data has recently been published (9).

### Bar Lathering

The lathering is one of the most important attributes of a bar of soap perceived by the consumer. The lathering, in conjunction with the fragrance, are probably the two most important attributes of a bar of soap in signaling its quality and performance to the consumer. The lathering